ELSEVIER

Journal of Chromatography A, 738 (1996) 311–312

JOURNAL OF CHROMATOGRAPHY A

Book Review

Modern Practice of Gas Chromatography, edited by R.L. Grob; Wiley-Interscience, Wiley, New York, Chichester, Brisbane, Toronto, Singapore, 3rd ed., 1995, XIV+888 pp., Price £70, ISBN 0-471-59700-7.

The first edition of this now large and well established work appeared in the 1970s, the second in the 1980s and the current edition in 1995. This edition employs some new authors with some redivision of topics in accordance with modern practice. The work includes fourteen chapters, an introduction and several appendices prepared by fifteen authors.

The work is divided into three parts, Part I, entitled Theory and Basics, Part II, Techniques and Instrumentation, and Part III, Applications, which is the largest part. The introduction by the editor partly outlines the history and development of chromatography, details various separation techniques and includes some definitions and nomenclature. Chapter 2, by the editor, is entitled Theory of Chromatography and describes various chromatographic methods, the theoretical aspects of gas chromatography followed by some of the operating parameters.

Chapter 3 concerns Packed and Capillary Columns and repeats and develops a small amount of the material in the preceding chapter. The importance of capillary columns is apparent both by the extent of the treatment and details of the principal types. A comparison of the performance of packed and capillary columns is shown quite vividly both graphically and by tabulation of the effective parameters.

Chapter 4 is entitled Optimising Separations in Gas Chromatography and commences with an overview of the compromises and variables experienced in optimisation. The effects of the selection of the instrumental characteristics followed by each of the operating parameters, i.e., carrier gas and its flow-rate, stationary phase and column, is effectively treated, but some repetition occurs here also.

Chapter 5, entitled Detectors and Data Handling, might well have been entitled Detectors, as Data Handling barely rates four paragraphs of treatment. Following a discussion of the parameters of importance in detector operation, each of the major types of detector, i.e. twelve, is individually treated.

Techniques for Gas Chromatography/Mass Spectrometry forms Chapter 6. This technique in recent years has found almost universal acceptance, with developments in chromatography, increased sensitivity and dramatically reduced costs of mass spectrometers. Commercial instruments at relatively low cost are common in laboratories and with in-built discriminating programs, little knowledge of mass spectrometry is necessary for many applications. Such procedures are vastly superior to the tentative means of identification that were used formerly. Following treatment of the general considerations, the common ionization modes of electron ionization and positive and negative chemical ionization are described in some detail. The chapter concludes with a brief mention of multidimensional techniques used in particular situations of tandem gas chromatography, tandem mass spectrometry or both combined.

Chapter 7 concerns Qualitative and Quantitative Analysis, almost half of the Chapter concerns methods of tentative identification, a topic of considerable interest to the reviewer, it being the subject of much work twenty five years ago. The limitations of such

PII S0021-9673(96)00166-5

procedures however have long been known. Quantitative Analysis concerns the vital issue of standardisation, the basis of any quantitative measurements. In this section, the issue of relevance or timeliness again appears, Table 7.4 concerns the frequency of use of various peak size techniques in 1966. Current usage would bear no resemblance to the figures shown.

Inlet Systems, a relatively complex topic and one brought into prominence by the widespread use of capillary chromatography forms Chapter 8. The major types of inlets are individually described and the characteristics of each type are demonstrated by typical uses, while the relevant disadvantages are listed.

Chapter 9 forms the first of the application chapters and here Physicochemical Measurements are described. The chapter clearly discusses the major types of measurements that have been made. This is a complex topic that has been the subject of much study, but has found limited application.

Chapter 10 concerns Petroleum and Related Analysis, a continuing major area of application that has been of importance since the inception of Gas Chromatography. The early developments are shown in an historical perspective. The subsequent sections, Exploration and Production, Refining, Petrochemicals and Process Chromatography, make interesting reading and clearly show the importance and application of Gas Chromatography.

Chapter 11 concerns Polymer Analysis and firstly describes some common polymer types and then focuses on the applications, of which pyrolysis probably predominates. Analysis of residual monomer and traces of contaminants are other important applications.

Clinical Applications form Chapter 12 and the major groups of drugs are detailed in sequence and include examination of drugs of abuse and blood alcohol. A uniform treatment has been adopted and pharmacological considerations precede the analytical details.

Forensic Science applications form Chapter 13 and the introductory sections outline the general requirements of forensic science. The analysis of drugs and forensic toxicology form the bulk of the chapter, the remainder considers accelerants, explosives and pyrolysis.

The final chapter concerns Environmental Applications and the important aspects of sample preparation from aqueous samples, soils and sediments and from gaseous samples are first detailed. Procedures, largely investigated by Environmental Protection Agency (EPA, USA), which find widespread application are described for many important groups of materials.

The application chapters relating to the petroleum industry, polymers, clinical use, forensic science and environmental concerns are each the subject of individual more detailed works, but the current presentations each provide a valuable and well documented introduction to the individual topics.

The book is generally well recommended as an introductory text, providing an extensive bibliography of over a thousand references to various aspects of Gas Chromatography. Some repetition is evident but with the current division of topics, this is largely inevitable. This new work follows the recently recommended IUPAC nomenclature, which it is hoped will find widespread acceptance in Chromatographic practice.

Kensington, Australia J.K. Haken